

We Claim as Our Invention:

1. An image pickup apparatus for picking up an image signal used for measurement of three-dimensional shape, comprising:

a projector for projecting non-periodic pattern light on an object of measurement;

a generator for generating image signals of a plurality of frames by using optical images of the object of measurement;

a limiter for limiting input of the optical images of the object of measurement to the generator; and

a timing controller for controlling the projector, the limiter, and the generator so that a signal of a pattern image of the object of measurement being irradiated with the non-periodic pattern light and a signal of a texture image of the object of measurement not being irradiated with the non-periodic pattern light are generated as the image signals of the frames in succession;

wherein the timing controller allows the projector to project the non-periodic pattern light on the object of measurement for a period of time shorter than an open time within the open time, the open time being a period during which the limiter does not limit input of the optical images of the object of measurement to the generator.

2. An image pickup apparatus as claimed in claim 1, wherein the timing controller controls the projector, the limiter, and the generator so that after the signal of the pattern image of the object of measurement being irradiated with the non-periodic pattern light is generated, the signal of the texture image of the object of measurement not being irradiated with the non-periodic pattern light is generated as the image signal of the frame in succession.

3. An image pickup apparatus as claimed in claim 1, wherein the limiter is a mechanical shutter.

4. An image pickup apparatus as claimed in claim 3, wherein the timing controller controls the projector, the limiter, and the generator so that after the signal of the texture image of the object of measurement not being irradiated with the non-

periodic pattern light is generated, the signal of the pattern image of the object of measurement being irradiated with the non-periodic pattern light is generated as the image signal of the frame in succession.

5 5. An image pickup apparatus as claimed in claim 3, further comprising:
an irradiator for irradiating the object of measurement with flashlight.

10 6. An image pickup apparatus as claimed in claim 5, wherein the timing
controller controls the projector, the limiter, the generator, and the irradiator so that
after the signal of the pattern image of the object of measurement being irradiated
with the non-periodic pattern light is generated, the signal of the texture image of the
object of measurement not being irradiated with the non-periodic pattern light but
with the flashlight is generated as the image signal of the frame in succession.

15 7. An image pickup apparatus as claimed in claim 5, wherein the timing
controller controls the projector, the limiter, the generator, and the irradiator so that
after the signal of the texture image of the object of measurement not being irradiated
with the non-periodic pattern light but with the flashlight is generated, the signal of
the pattern image of the object of measurement being irradiated with the non-
20 periodic pattern light is generated as the image signal of the frame in succession.

25 8. An image pickup apparatus as claimed in claim 1, wherein the
generator generates a plurality of the pattern image signals by using a plurality of the
optical images of the object of measurement being irradiated with the non-periodic
pattern light, the optical images being simultaneously inputted from a plurality of
different viewpoints.

30 9. An image pickup method for an image pickup apparatus for picking
up an image used for measurement of a three-dimensional shape, the method
comprising the steps of:
projecting non-periodic pattern light on an object of measurement;

generating image signals of a plurality of frames by using optical images of the object of measurement;

limiting input of the optical images of the object of measurement to processing in the step of generating; and

controlling processing in the steps of projecting, generating and limiting, so that a signal of a pattern image of the object of measurement being irradiated with the non-periodic pattern light and a signal of a texture image of the object of measurement not being irradiated with the non-periodic pattern light are generated as the image signals of the frames in succession;

wherein processing in the step of controlling allows the processing in the step of projecting to project the non-periodic pattern light on the object of measurement for a period of time shorter than an open time within the open time, the open time being a period during which the processing in the step of limiting does not limit input of the optical images of the object of measurement to the processing in the step of generating.

10. A recording medium for recording a computer readable program for controlling an image pickup apparatus, the image pickup apparatus including a projector for projecting non-periodic pattern light on an object of measurement, a generator for generating image signals of a plurality of frames by using optical images of the object of measurement, and a limiter for limiting input of the optical images of the object of measurement to the generator, the program comprising a control step for controlling the projector, the limiter, and the generator so that a signal of a pattern image of the object of measurement being irradiated with the non-periodic pattern light and a signal of a texture image of the object of measurement not being irradiated with the non-periodic pattern light are generated as the image signals of the frames in succession, wherein processing in the control step allows the projector to project the non-periodic pattern light on the object of measurement for a period of time shorter than an open time within the open time, the open time being a period during which the limiter does not limit input of the optical images of the object of measurement to the generator.